SECTION 16075

ELECTRICAL IDENTIFICATION

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LANL MASTER CONSTRUCTION SPECIFICATION

When editing to suit Project, author shall add job-specific requirements and delete only those portions that do not apply to the Project (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the Engineering Standards Manual (ESM) Electrical POC. Refer to http://www.lanl.gov/f6stds/pubf6stds/engrman/HTML/poc_techcom1.htm#elec for the Engineering Standards Manual Personnel Link Index.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within “stars” during editing.

Specification developed for ML-3 / ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Component identification tags.

B. Equipment nameplates.

C. Outlet labels.

D. Wire markers.

E. Voltage markers.

F. Warning signs.

G. Arc flash warning labels.

H. Floor marking.

I. Underground warning tape.

1.2 LANL PERFORMED WORK

A. None

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01330 *Submittal Procedures*:

1. Catalog Data: Submit manufacturer’s catalog literature for each product required.

2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

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Include the following paragraph for submission of samples for selection of finish, color, texture, and other properties.
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3. Samples:

   a. Submit [two] [_____] samples of each type of identification products applicable to project.

   b. Submit [two] [_____] nameplates illustrating materials and engraving quality.

4. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of the *National Electrical Code* (NEC) and OSHA.

B. Conform to applicable requirements of the following ANSI Standards:

1. Z535.1 *Safety Color Code*.

2. Z535.2 *Environmental and Facility Safety Signs*.

3. Z535.3 *Criteria for Safety Symbols and Labels*.

4. Z535.4 *Product Safety Signs and Labels*.

5. Z535.5 Safety Tags and Barricade Tapes (for Temporary Hazards).

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; follow Section 01630, *Product Options and Substitutions*.

2.2 COMPONENT IDENTIFICATION TAGS

A. Furnish component identification tags as specified below [and scheduled on the Drawings] to identify electrical equipment using the system designation, equipment identification, tech area, and building number.

B. Coordinate electrical component identification tag schedule with final equipment identification scheme for project.

C. Provide component identification tags with black letters on yellow background with 2 in. by 3 in. dimensions.

D. Provide minimum 48 point size lettering.

E. Provide tags made of one of the following materials:

1. Type 1 (Indoor Applications Only):

a. Laminated plastic adhesive tape with machine printed letters.

b. Manufacturer: Brother.

2. Type 2:

a. Two-ply plastic nameplate with letters engraved through yellow surface showing black core.

b. Provide UV stabilized material for outdoor applications.

c. Manufacturer: Seton Nameplate Corp.

2.3 EQUIPMENT NAMEPLATES

A. Furnish equipment nameplates as specified below [and scheduled on the Drawings] to indicate the following information:

1. Category I nameplates – Circuit directory information including circuit number, equipment identification and location of equipment served or served from, voltage, number of phases, and number of wires.

2. Category II nameplates – General or operational information including basic instructions or specific operating procedures.

3. Category III nameplates – Emergency operations information including emergency shutdown procedures.

B. Coordinate equipment nameplate schedule with equipment numbering scheme provided by Contract Administrator.

C. Provide nameplates made of one of the following materials:

1. Type 1 (Indoor Applications Only):

a. Laminated plastic adhesive tape with machine printed letters.

b. Manufacturer: Brother.

2. Type 2:

a. Two-ply plates with letters engraved through surface color showing core color.

b. Use UV stabilized material for outdoor applications.

c. Manufacturer: Seton Nameplate Corp.

D. Provide 10 point minimum size lettering.

E. Provide colors as follows:

1. Category I nameplates: White or black letters on blue background.

2. Category II nameplates: White letters on black background.

3. Category III nameplates: White or black letters on red background.

F. Dimensions shall be as follows:

1. Category I nameplates: 1 inch by 2 1/2 inch minimum.

2. Category II nameplates: As required for instructions, 1 inch by 2 1/2 inch minimum.

3. Category III nameplates: As required for instructions, 1 inch by 2 1/2 inch minimum.

2.4 OUTLET LABELS

A. Furnish a typewritten or machine printed label for each switch and receptacle outlet indicating circuit number, panelboard, and voltage.

B. Provide labels of the following materials:

1. Laminated plastic adhesive tape with machine printed letters.

2. Manufacturer: Brother.

C. Provide black, 10 point minimum size lettering on a white background.

2.5 WIRE MARKERS

A. Provide wire markers for power, control, instrumentation, alarm, and communication circuit wires.

B. Furnish split sleeve, tubular heat-shrinkable sleeve, or self-laminating adhesive type wire markers.

C. Locate a wire marker on each conductor at switchgear, panelboards, pull boxes, outlet and junction boxes, and each load connection.

D. Provide typewritten lettering on wire markers as follows:

1. Power and lighting circuits: As-built branch circuit or feeder circuit number.

2. Control circuits: As-built control wire number indicated on schematic and interconnection diagrams or equipment manufacturer's wiring diagrams.

E. Manufacturer: LEM Products, Inc., Brady, Panduit.

2.6 VOLTAGE MARKERS

A. Furnish voltage markers for transformers, switchgear, panelboards, starters, motor control centers, safety switches, pull boxes, cabinets, and conduits.

B. Provide flexible pressure sensitive vinyl markers with minimum 1-1/8 inch X 4-1/4 inch orange background and black letters.

C. Provide voltage markers with lettering indicating the highest voltage present as follows:

1. 208Y/120 volt system: 208 VOLTS

2. 120/240 and 240 volt system: 240 VOLTS

3. 480Y/277 and 480 volt system: 480 VOLTS

4. 13.2 kV systems: 13200 VOLTS

5. Fire alarm system: FIRE ALARM

6. Telephone/data system: TELEPHONE

D. Manufacturer: Electromark, LEM Products, Inc.

2.7 EMERGENCY SYSTEM IDENTIFICATION

A. Furnish identification for emergency system generators, transfer switches, transformers, switchgear, panelboards, starters, motor control centers, safety switches, pull boxes, junction boxes, enclosures, and cabinets as require by NEC Article 700.

B. Provide flexible pressure sensitive vinyl markers with minimum 1-1/8 inch X 4-1/4 inch orange background and black letters indicating EMERGENCY SYSTEM.

2.8 WARNING SIGNS

A. Furnish warning signs for low-voltage and medium-voltage transformers, switchgear, switchboards, panelboards, motor starters, motor control centers, safety switches, pull boxes, and cabinets.

B. Use flexible warning signs that conform to ANSI Z535.4 and OSHA Danger and Caution specifications.

C. Provide minimum 2 inches X 4 inches warning signs.

D. Provide warning signs with format and lettering as follows:

1. Signal word: DANGER

2. Signal word panel color: red with safety alert symbol.

3. Word message:
   Keep Out!
   Hazardous voltage inside
   Will shock, burn, or cause death.

4. Safety symbol: ISO 3864 “lightning bolt” in yellow triangle.

E. Materials:

1. For indoor applications use flexible, pressure sensitive, polyester base with polyester overlaminate.

2. For outdoor applications use aluminum signs.

F. Manufacturer: Seton Name Plate Co., Safety Label Solutions, Hazard Communication Systems, Electromark.

2.9 ARC FLASH WARNING LABELS

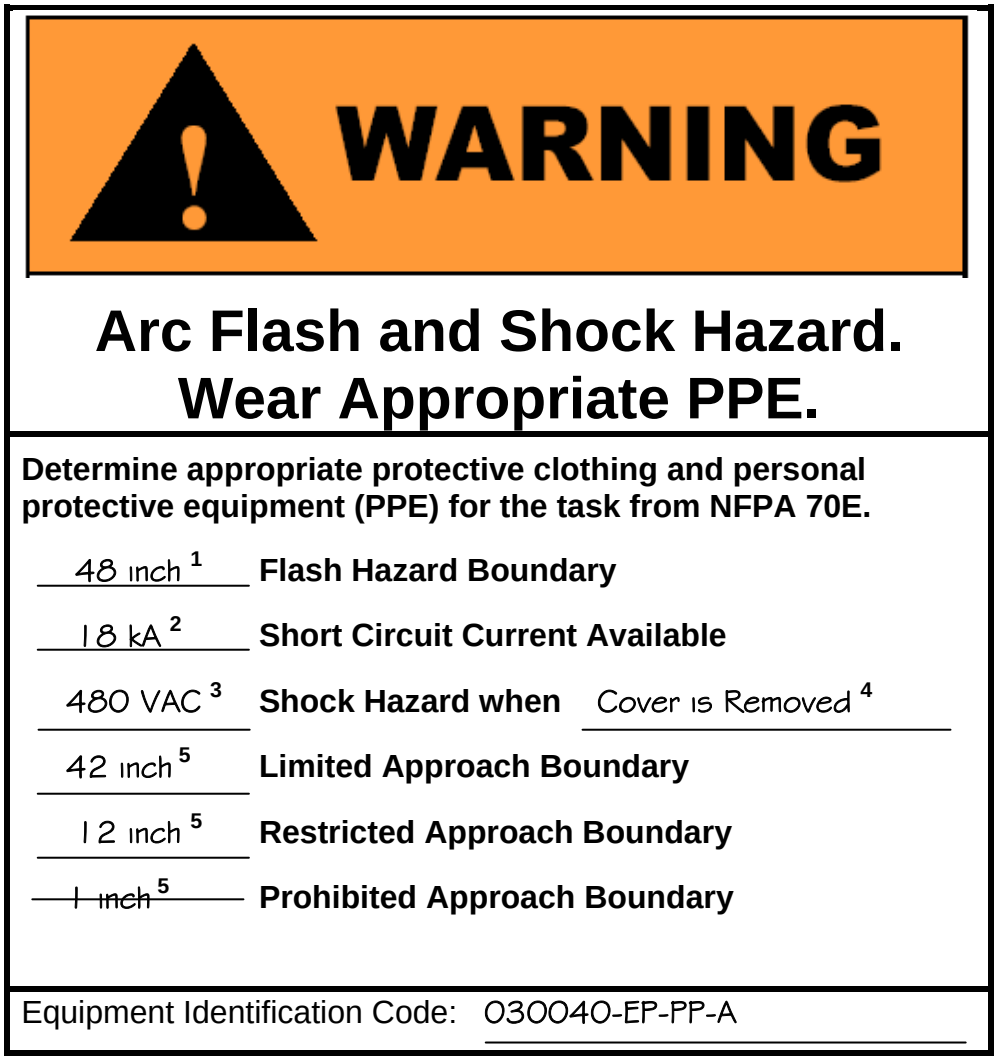
A. Furnish arc flash and electrocution hazard warning labels for switchgear, transformers, panelboards, motor starters, motor control centers, safety switches, and other locations as required by the NEC.

B. Provide warning labels that comply with Z535.4. Color in top part of sign shall be ANSI “safety orange”. All lettering on labels shall be black; red is used below to indicate application-specific information.

C. Provide labels that are printed on self-adhesive polyester with pressure-sensitive adhesive back and covered with a clear polyester film. Outdoor labels shall be suitable for a high-UV environment.

D. Label dimensions shall be approximately 4 inches high by 5 inches wide.

E. Provide labels similar in design to that below. Use a black, UV-resistant, permanent marker to legibly fill in the application-specific information indicated in the notes.



Notes:

1. Flash hazard boundary per NFPA 70E.
2. Available short circuit current (RMS symmetrical amperes) calculated in accordance with the LANL *Engineering Standards Manual*.
3. System phase-to-phase voltage.
4. Condition that exposes worker to electrical shock hazard.
5. From NFPA 70E based on nominal system phase-to-phase voltage.

F. Manufacturer: Summit Electric Supply, Seton Name Plate Co., Safety Label Solutions, Hazard Communication Systems, Electromark.

2.10 FLOOR MARKING TAPE

A. Provide 2-inch wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay, for marking NEC clear working space at electrical equipment.

B. Manufacturer: 3M Safety Stripe Tape 5700.

2.11 UNDERGROUND WARNING TAPE

A. Furnish underground warning tape for underground cables, conduits and duct banks.

B. Use 6 inch wide, 0.004 inch thick, polyethylene underground warning tape black lettering and the following background colors:

1. Electric: Red

2. Telephone/data: Orange

C. Provide lettering that indicates the type service buried below.

1. Electric: "CAUTION ELECTRIC LINE BURIED BELOW"

2. Telephone/data: "CAUTION TELEPHONE LINE BURIED BELOW"

D. Manufacturer: Utility Safeguard, LLC.

PART 3 EXECUTION

3.1 EXISTING WORK

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Delete this article when existing construction is not affected. Edit to match project requirements.
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A. Install identification on existing [equipment] [_____] to remain in accordance with this section.

B. Install identification on unmarked existing [equipment] [_____].

C. Replace lost [nameplates] [labels] [markers].

3.2 EXAMINATION

A. Examine surfaces to receive electrical identification products for compliance with installation tolerances and other conditions affecting performance of the identification products. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 COORDINATION

A. Verify electrical equipment designations with LANL through the Contract Administrator.

3.4 INSTALLATION

A. Install electrical identification products after completion of painting.

B. Install electrical identification products only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

C. Clean surface where electrical identification product is to be placed.

D. Use manufacturer's recommended adhesive for engraved tags and nameplates.

E. Place electrical identification products centered and parallel to equipment lines.

F. Install wire markers on power, control and communication conductors at panelboards, pull boxes, outlet boxes, junction boxes, switchgear and load connections. Position markers so they can be read from the front of the enclosure.

G. Install voltage markers at the following locations and position markers so they can be read from floor:

1. Front and rear of each medium-voltage switchgear.

2. Front of each medium-voltage transformer.

3. Front and rear of each free-standing low- voltage switchgear or switchboard section.

4. Front of each low-voltage transformer, switchboard, panelboard, motor control center, enclosed circuit breaker, safety switch and starter enclosure.

5. Cover of each pull box containing low-voltage or medium-voltage conductors.

6. Each 2 inch and larger conduit longer than 6 feet; space markers not more than 20 feet on center.

H. Install identification for emergency system markers at the following locations and position markers so they can be read from floor:

1. Front of each emergency system generator.

2. Front and rear of each free-standing emergency system switchgear or switchboard section.

3. Front of each emergency system transfer switch, transformer, switchboard, panelboard, motor control center, enclosed circuit breaker, safety switch, and starter enclosure.

4. Cover of each pull box and junction box containing emergency system conductors.

5. Each emergency system conduit longer than 6 feet; space markers not more than 20 feet on center.

I. Install warning signs at the following locations and position signs so they can be read from floor:

1. Front and rear of each medium-voltage switchgear.

2. Front of each medium-voltage transformer.

3. Front and rear of each low-voltage switchgear or switchboard section.

4. Front of each low-voltage transformer, switchboard, panelboard, motor control center, enclosed circuit breaker, safety switch, and motor starter enclosure.

5. Cover of each pull box containing exposed low-voltage or medium-voltage conductors.

J. Install arc flash warning labels at the following locations and position signs so they can be read from floor:

1. Front and rear of each medium-voltage switchgear.

2. Front of each medium-voltage transformer.

3. Front and rear of each freestanding low-voltage switchgear or switchboard section.

4. Front of each low-voltage transformer, panelboard, motor control center, enclosed circuit breaker, safety switch, and motor starter enclosure.

5. Cover of each pull box containing exposed low-voltage or medium-voltage conductors.

K. Install floor marking tape on the floor at the locations listed below to indicate clear working space required by the NEC. Thoroughly prepare floor surface to receive tape. Outline working space with tape then infill with diagonal tape stripes placed 6 inches on center.

1. Front and rear of each medium-voltage switchgear.

2. Front of each medium-voltage transformer.

3. Front and rear of each low-voltage switchgear or switchboard section.

4. Front of each low-voltage transformer, switchboard, panelboard, motor control center, enclosed circuit breaker, safety switch, and motor starter enclosure.

L. Install underground warning tape in trench above underground conduit, 1 foot below ground surface.

END OF SECTION

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Do not delete the following reference information.

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FOR LANL USE ONLY

This project specification is based on LANL Master Construction Specification Rev. 0, dated February 27, 2004.